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Selected US specifications from IPC sub-classes
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(54) Containers adaptable for carrying different loads

(57) A container unit adapted to store simultaneously liquid and solid materials and to deliver blends of the materials comprises at least one container for liquid materials and at least one container for solid materials. The container for solid materials comprises at its floor means (9) for conveying solid materials out of the container via a port (10) located at one end thereof, at least one solid container being adaptable e.g. by means of a false floor (15) such that at least part of this solid container is able to contain a liquid material.

The invention is especially useful in vehicles for the transport and blending of explosives in that it enables such vehicles to operate much more efficiently.

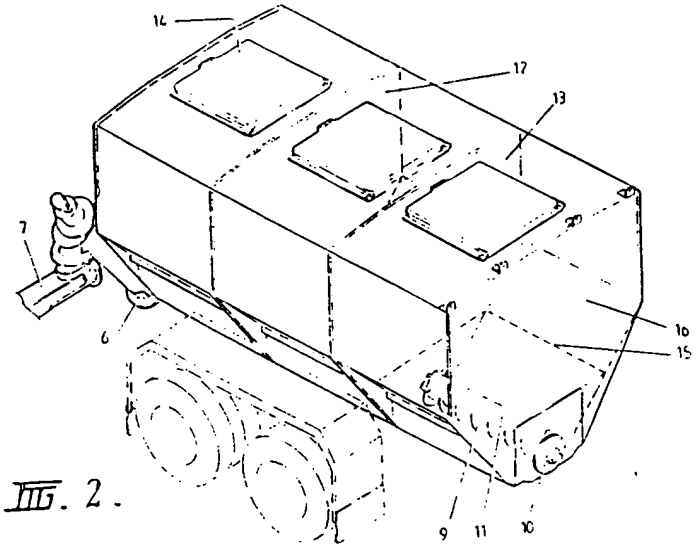
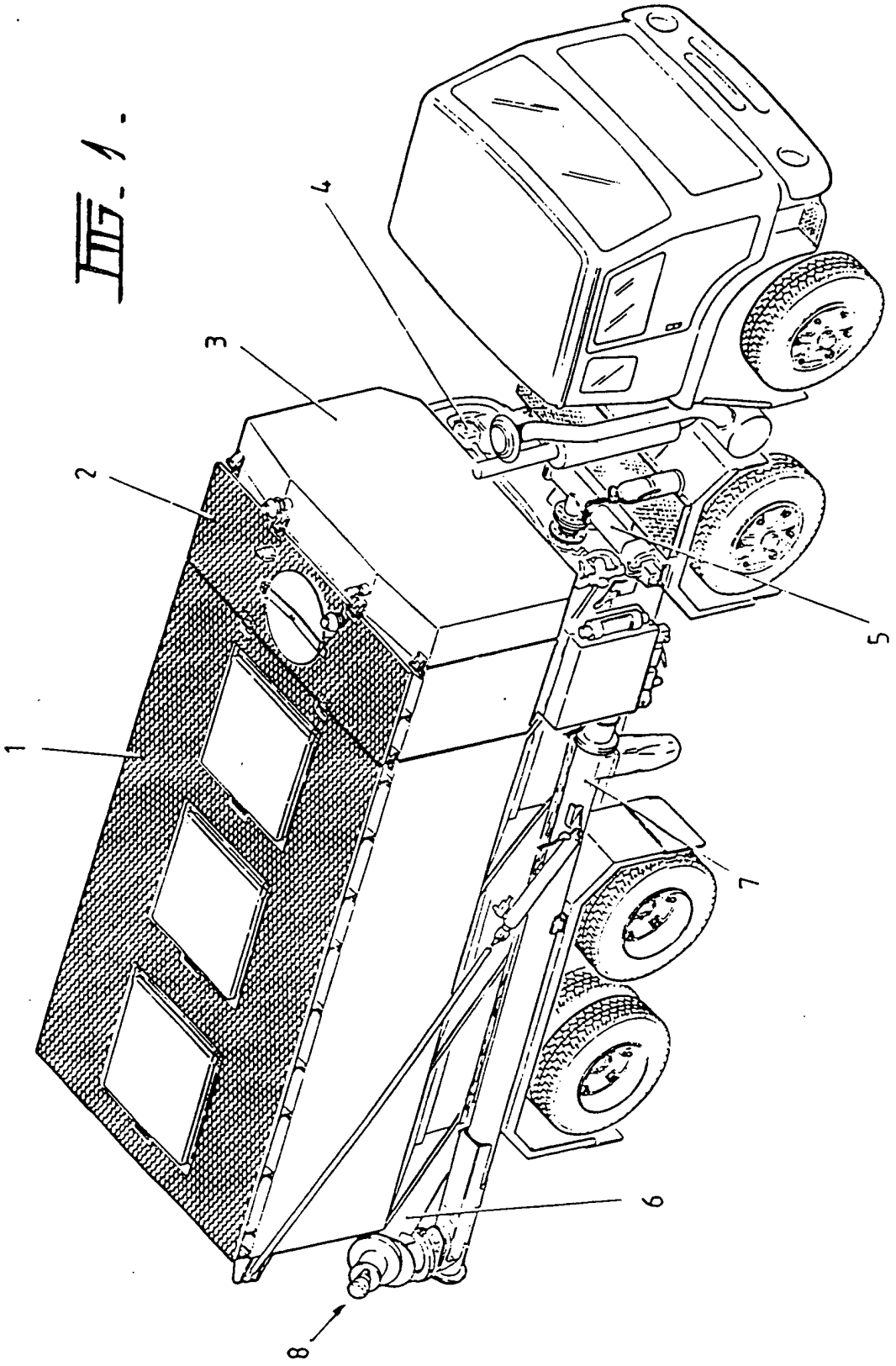
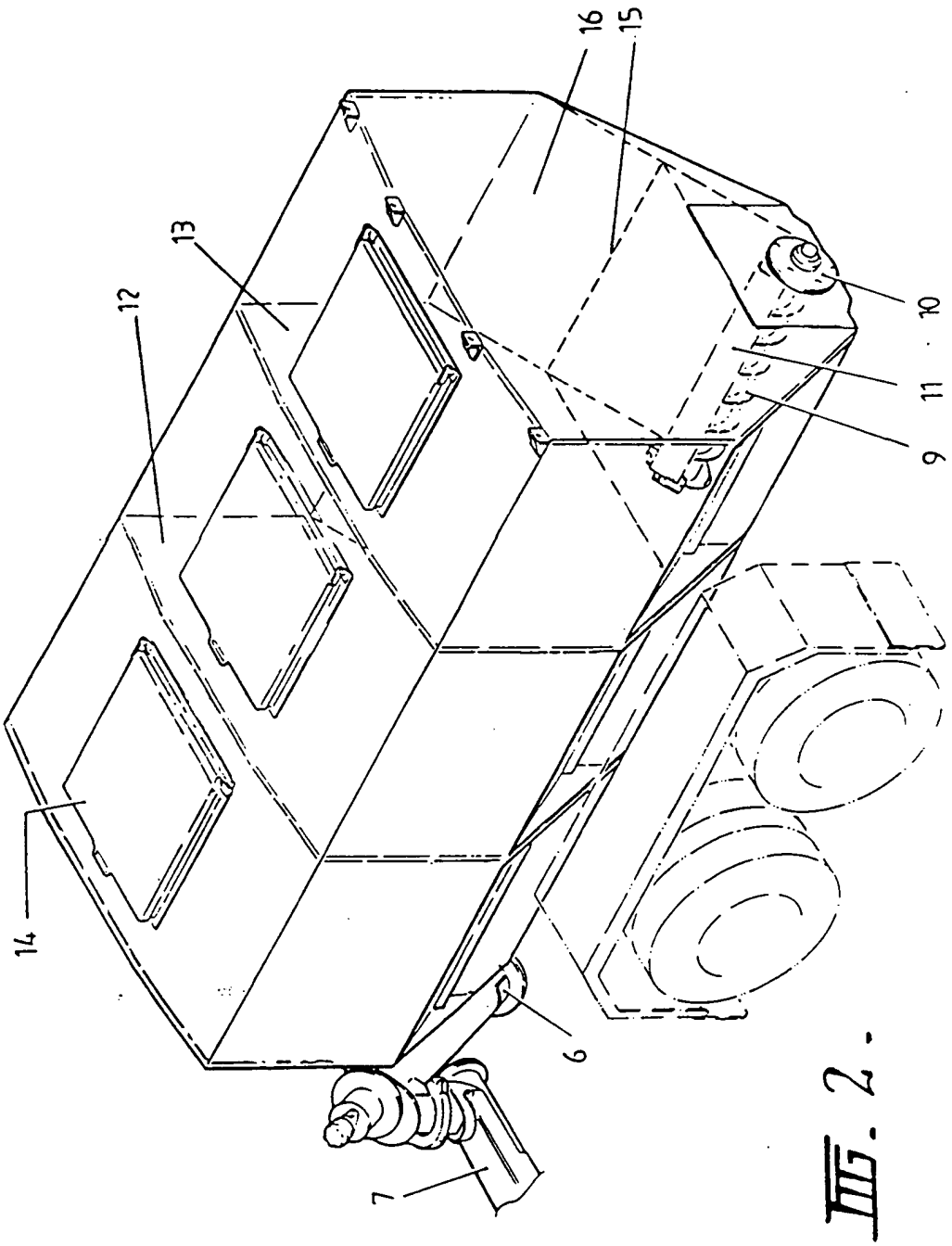


FIG. 2.

The drawing(s) originally filed was (were) informal and the print here reproduced is taken from a later filed formal copy.
This print embodies corrections made under Section 117(1) of the Patents Act 1977.

Фиг. 1.





Фиг. 2.

CONTAINER UNIT

This invention relates to a container unit for the storage and delivery to a desired location of both solid and liquid materials.

Container units of this general type are already known to the art. They comprise containers for both solid and liquid materials, and the means for blending and dispensing them.

An example of such a container unit is the one used for the storage of the ingredients for "ANFO" (ammonium nitrate - fuel oil) - type explosive compositions, and for the in situ preparation of such compositions. Such a unit comprises a container for solid oxygen-generating salt, generally ammonium nitrate, and a separate container for liquid fuel, together with the necessary pumping, metering, blending and delivery systems. The entire unit is often mounted on a motorized vehicle so that it can be driven to a site

and the explosive composition mixed and delivered directly into boreholes. Such units generally comprise a third container for a liquid emulsion of an aqueous solution of an oxygen-generating salt in the fuel; this is used to give an ANFO composition a degree of water resistance when the boreholes are wet.

The proportions of ingredients generally used in ANFO compositions dictate that the storage capacity available for the oxygen-releasing salt be considerably larger than that available for the other two ingredients. However, there are occasions when this apportioning can lead to problems. For example, if there are many wet boreholes, a high proportion of emulsion must be added to the salt-fuel blend to give the explosive composition water resistance. As a result, the emulsion may be completely utilised before loading is finished, and this may necessitate a vehicle leaving a site for more emulsion, often with large quantities of the other ingredients still on board. The poor economics of this situation, especially where a long road journey is involved, are evident.

It has now been found that this problem can be overcome by utilising a novel form of container unit. There is therefore provided, according to the present invention, a container unit adapted to store simultaneously liquid and solid materials and to deliver blends of the materials to a desired location, the unit comprising at least one container for liquid materials and at least one container for solid materials, the container for solid materials comprising at the floor thereof means for conveying solid materials out of the container through a port located at one end thereof, at least one container

for solid materials being adaptable such that at least part thereof is able to contain a liquid material.

This invention permits of considerable flexibility in the storage of solid and liquid materials, and the blending and delivery thereof. For example, in the case of ANFO compositions as described hereinabove, if it is known that a substantial number of wet boreholes are to be filled, that part of the salt container which can be adapted to contain a liquid material may be so adapted and used to hold a quantity of emulsion in excess of that normally held by the emulsion container.

The container for the solid material (hereinafter referred to as "the solids container" may be any convenient container. It may be, for example, a simple square or rectangular tank. One feature of this container is that the solid material must be moved by a means which is positioned at the floor thereof, the solid material leaving the container through a port located at one end. The port is thus located near where horizontal and vertical surfaces of the container meet. It may be in the floor, but it is preferably in a vertical surface.

The means for conveying the solid material out of the container may be any convenient means known to the art. An especially good method is by using an auger, that is, a helical screw located at and running the entire length of the floor. As the auger turns, it moves solid material towards one end, and a port at this end will permit solid material to leave the container. The floor is advantageously not planar, but has substantially the form of a "V" in cross section and the auger sits within this "V".

A part of this solids container may be adapted to contain a liquid instead of a solid. This may be done by any convenient means. One simple method is to incorporate in the container a vertical transverse partition which stops at the "V" of the floor as hereinabove described. A liquid-tight false floor may then be fitted thus defining with the partition and the walls of the container a separate compartment which can be used for the storage of liquid. The false floor may be positioned and removed manually, or by any other means such as hydraulic, pneumatic, electrical, mechanical or any combinations of these.

The person skilled in the art will readily appreciate that there are many ways of achieving the same result. For example, the solids container may have a single continuous interior and a part of the container may be able to be segregated from the remainder by a suitable partitioning means, for example, inflatable diaphragms or flexible membranes which when not in use may be collapsed, allowing use of the entire container for the salt.

The container for the liquid materials (hereinafter referred to as "the liquids container") may be any convenient container known to the art. It will generally be placed close or adjacent to the solids container. It is of course possible for the unit to comprise more than one liquids container, and in the ANFO compositions container unit as described hereinabove, there are two liquids containers, one for liquid fuel and one for emulsion. These containers are equipped with all of the appropriate pumping and metering equipment known to the art.

In operation, solid and liquid materials are drawn from the respective containers for delivery to

a desired location. Any blending required may take place immediately prior to delivery by using any suitable blending apparatus known to the art. This is preferably located adjacent to the external side of the port from which the solid material exits from the solids container.

The invention will now be further described with reference to an ANFO explosive composition manufacturing vehicle as shown in the drawings.

Figure 1 is a perspective view of a vehicle used for the transport of materials and the in situ manufacture of explosive compositions.

Figure 2 is a part sectional view of a solids container according to the invention.

The vehicle carries three containers, a container 1 for oxygen-releasing salt (usually ammonium nitrate), a container 2 for emulsion and a container 3 for liquid fuel. The fuel and emulsion are pumped from their containers by means of pumps 4 and 5 respectively. The oxygen-releasing salt is moved from the container by means of an auger located internally in the container. It emerges from that end of the container at the rear of the vehicle and is conveyed by an inclined auger 6 to a delivery auger 7. The delivery auger 7 is mounted on the inclined auger 6 by means of a swivel 8 which allows it to be carried inboard as shown in Figure 1, and swung outboard to deliver an explosive composition. The emulsion and fuel are conveyed to the delivery auger and are added at a point just downstream of the swivel.

The solids container 1 is basically rectangular in transverse cross section but with a floor 16 which is essentially "V"-shaped in cross-section, the "V" extending downwardly of the remainder of the container to form a trough in which is located a container auger 9 mounted on bearings

one of which is shown at 10. The container auger is partially covered throughout its length by an auger hood 11 which has the cross-sectional shape of an inverted "V". The container is internally divided by partitions 12 and 13 into three compartments each of which has its own lid 14. The partitions follow the contours of the upper surface of the auger hood 11 and extend from the edges of the hood to the respective floor surfaces of the container. These edges have no other contact with the floor, and this provides an opening on either side of the auger hood which permits the oxygen-releasing salt to reach the auger 9 and thus be taken out of the container. One of the compartments of the container is provided with a false floor 15. This false floor is liquid-tight and prevents any material placed in that particular compartment from reaching the auger. It is thus extremely useful for the storage and transport of liquids, for example, a larger quantity of emulsion. The false floor is in sections and is bolted in place.

The person skilled in the art will be able to see many further embodiments of the invention which are within its scope. For example, the false floor need not be manually bolted in, but may be retracted hydraulically or by other non-manual means. A further embodiment is one in which the false floor forms the auger hood, and can be closed against the floor or sides of the container to form a liquid-tight floor.

The claims defining this invention are as follows:

1. A container unit adapted to store simultaneously liquid and solid materials and to deliver blends of the materials to a desired location, the unit comprising at least one container for liquid materials and at least one container for solid materials, the container for solid materials comprising at the floor thereof means for conveying solid materials out of the container through a port located at one end thereof, at least one container for solid materials being adaptable such that at least part thereof is able to contain a liquid material.

2. A container unit according to claim 1, wherein the container for solid materials is adaptable by means of a false floor fitted therein.

3. A motorised vehicle for the transport, mixing and dispensing of ANFO-type explosives, the vehicle comprising at least one container unit according to any one of claims 1 or 2.

4. A container unit substantially as described with reference to the drawings.

5. A motorised vehicle substantially as described with reference to the drawings.

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